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GOODS/SERVICES REQUISITION and SUPPLY SYSTEM

Related Applications

5 The co-applicants, Imaging Technologies Pty Limited,
have made a number of patent applications relating to
automated retailing and vending systems and devices. The
disclosure of the co-applicants earlier filed international
patent applications PCT/AU93/00416, PCT/AU95/00154
(publication numbers WO94/04446 and WO95/26004,
10 respectively) and PCT/AU97/00058 are incorporated herein by
reference. PCT/AU93/00416 relates to a vending machine
which facilitates recycling of complex articles, such as
printer and toner cartridges. PCT/AU95/00154 discloses an
electronic catalogue device and system for enabling remote
15 ordering of goods/services. PCT/AU97/00058 discloses an
improved electronic ordering system which, in particular,
provides a considerable retailing network utilising PC's,
dedicated electronic ordering devices (e.g., kiosks),
combined vending and electronic ordering devices, all
20 connected together via a communications network (which may
be the Internet) for ordering and obtaining any product.

Background of Invention

1) Field

25 The present invention relates to a goods/services
requisition and supply system, and particularly, but
not exclusively, to a computer based requisition
system utilising a vending device for supply.

2) Background

30 Previously, where an office worker wished to
requisition office supplies, they would make a phone call
to the store department who would requisition the required
goods, cost it to the relevant department and advise when
it was ready for delivery or collection.

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Over time the cost of operating (particularly for medium sized and small operations) such requisition systems and storage departments created a trend towards out sourcing the provision of goods and services such as office supplies. Recent trends have been towards replacing telephone ordering with computer based ordering of goods. Either a paper trail order may be generated from a computer based system or there may be a direct or network link to the supplier by which computer generated orders may be directly sent. The supplier will then fill the order by delivery, and invoice.

Although such computer based ordering systems are more convenient than the former manual process, nevertheless there is still a very significant time delay between generating an order and having the order filled. Unless the orderer carefully monitors their requirements this can lead to shortages of material in the office or, at the other extreme, maintenance of large supplies of stock not required for use until some time in the future.

It would be useful if a system were available in which a person could requisition an item, for example by generating an order on his computer, and that item would then be immediately available locally on site.

Some of the patent applications referenced above disclose devices which provide a local vending facility combined with a connection to a supplier for audit purposes and also for ordering goods from a remote location. These devices are generally quite complex hardware arrangements, however, and require significant computing power. They must also, generally, satisfy the needs of multiple users who may belong to different firms, and are usually connected in separate "retailing networks".

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Summary of Invention

From a first aspect, the present invention provides a goods/services requisition and supply system, comprising a computer system, ordering means for generating an order for a goods/services item in response to operation of the computer system by a user, and a vending device connected to the computer system and including storage means for storing goods, the vending device being arranged to be responsive to the ordering means generating an order for an item available in the storage means, to make the item available for collection by the user.

In order to be able to pick up the item from the vending device the vending device may require the input by the user of an approval code, such as a PIN. The ordering means preferably generates the approval code for the user which he may then enter at the vending device.

By "computer system" is meant a proprietary computer system, such as a local area network (LAN), Intranet or Enterprise computer system. That is, the system is likely to be operated by a single entity, eg. a single company. Further, "computer system" does not include an arrangement where the vending device and computer system are one and the same eg. a stand alone vending device which is controlled by a processor in the same housing. The term "computer system" may include a single computer, such as a PC or server computer, for example, which is connected to control the vending device. Preferably, the "computer system" would be a proprietary network system, as discussed above. The "computer system" is preferably not a system which is dedicated to providing an interface with the vending device. The computer system is preferably used for other tasks e.g., it may be a general office computer system with processing facilities, document management facilities, etc. The interface with the vending device is merely an additional function of the

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computer system. Where the computer system is a local area network, it may be connected in a wide area network (WAN), such as Extranet, or may be connected to the Internet.

In a preferred embodiment the ordering means
5 enables a user to place an order from his desktop PC which is connected in the computer system, and the vending device then makes the item that is ordered available on site. For example, if an office worker determines that a printer is running out of ink, they will access the ordering means
10 from their PC to order a printer cartridge stored in the vending device. The vending device will then make that printer cartridge available to the user. The user therefore does not have to wait for delivery from a remote location.

15 Preferably, the ordering means is also arranged to advise a supplier (preferably by a communications link, which may be the Internet or any other communications link) that an item has been requisitioned. The ordering means also preferably advises the supplier that the order has
20 been filled via the local vending device. The supplier can then generate an invoice.

Rather than the approval code being generated by the ordering means, the ordering means may ask the supplier for an approval code (over the communications link) and the
25 supplier would provide the approval code to a user for access to the vending device.

Preferably, the ordering means is able to access a database which keeps a running record of the items that are available at the vending device. When an item is
30 requisitioned from the vending device, the ordering means is arranged to adjust the database accordingly. The supplier preferably also has access to this database so that they are aware of the items available and can audit the orders which have been filled.

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The system of the present invention, therefore, preferably has the advantages that the customer (user) can obtain the required items simply and easily without having to wait for delivery from a remote location. Furthermore, a supplier who is maintaining the device and ordering means can keep track of the items being requisitioned and can be in a position to maintain the stock of the vending device to ensure that the customer's requirements are always able to be met.

10 Preferably the ordering means also enables a user to order goods which are not available at the vending device but which are available by delivery. This embodiment therefore marries the benefits of systems which allow remote ordering from a computer system, with the
15 benefits of having goods immediately available on site.

Preferably the supplier can monitor which goods are "critical" and can keep these goods in the vending device so that they are always available at very short notice. Less-critical goods can be made available for
20 remote ordering and delivery.

Preferably, when the ordering means receives an order from the user of the computer system, it is arranged to determine whether an item is available on site or needs to be remotely ordered. If the item is not available
25 on-site, the ordering means advises the user and automatically generates an order to the supplier so that the item will be delivered later. If the item is available from the vending device, the ordering means advises the user and the user then attends the vending
30 device to receive the item.

As an alternative to a separate invoicing procedure instituted by the supplier, a user may make payment on ordering, for example, via an EFT system associated with the vending device. There may be a network
35 or direct connection to the EFT system from the vending

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Preferably, the vending device is arranged to operate as a peripheral to the computer system. Control means (e.g. control software) for the vending device is preferably resident on the computer system, eg. on the network server. Preferably the ordering means is also resident on the computer system. The behaviour of the vending device can therefore be controlled by the computer system. This minimises the hardware needs for the vending device. The computer power of the computing system is used to control and monitor ordering and control the vending device. The vending device can therefore be very much less complex than the type of stand-alone vending devices such as described in the above-referenced applications. Preferably, control is directly from the computer system e.g., to the extent of controlling the mechanisms which enable delivery of product from the vending device, from the computer system itself. The vending device is preferably remotely controlled.

The ordering means may not be resident on the
35 computer system. It may be elsewhere, such as, for

example, on a website of a supplier who has product in the vending device. In use, the user of the computer system logs onto the website of the supplier to access the ordering means to generate an order for a product. The ordering means determines whether the product is available at the local vending device and, if so, generates a token or approval code for the user, the token or approval code also being downloaded to the computer system for enabling access to the vending device. The user then attends at the local vending device, enters the token or approval code and receives the product.

Multiple suppliers may have access to the system. In other words, goods from different suppliers could be stored in the local vending device for distribution to users ordering from the system. Approval codes may be generated by the ordering means of each supplier webpage, e.g. the Internet. In other words, multiple suppliers may download approval codes to the system for approving access to the local device of the user to obtain a product. Large corporations could therefore maintain local vending devices on site which could provide multiple products from multiple suppliers to the corporation's employees. Each employee could order from the network of a corporation and on receipt of the correct approval code collect the goods from the local vending device.

The present invention further provides a vending device including means for storing items for vending, and control means enabling remote control of the vending device from a remote location.

The present invention further provides local supply system comprising a computer system, ordering means for generating an order for a goods/services item in response to operation of the computer system, the ordering means including means for determining whether a local vending device stores a goods/services item and, in

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response to the determination generating an order for the item to be dispensed from the local vending device.

The present invention yet further provides a method of providing goods/services items to a person, comprising the steps of providing items on site stored in a local vending device which is arranged to be accessed by a computer system of the person to control vending of goods to the person.

In the above aspect of the invention the local vending device is connected to the computer system, e.g. LAN or WAN. In a further aspect of the present invention, the vending device may not be permanently connected to the computer system of a user, but may be available for connection to that computer system, e.g. via the Internet or other type of network connection.

From a further aspect, the present invention provides a goods/services requisition and supply system, comprising a computer system, ordering means for generating an order for a goods/services item in response to operation of the computer system by a user, and a vending device connected to a network that allows the computer system to communicate with the vending device, the vending device including a storage means for storing goods, and input means enabling the vending device to determine that a user of the vending device is approved to collect goods.

The ordering means is preferably resident on the computer system, but may be resident elsewhere e.g. on a supplier's website.

The vending device may be located in an office building serving a number of different company's computer systems. In operation, a user of a computer system accesses the ordering means and determines that the item they require is available at a vending device, the ordering means provides the user with a token or approval code, and also connects to the vending device via a network such as

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the Internet and provides the vending device with the approval code or token. The user enters the approval code or token via the input means, the vending device determines that the token or approval code is the correct one and
5 delivers the item to the user.

Features and advantages of the present invention will become apparent from the following description of embodiments thereof, by way of example only, with reference to the accompanying drawings in which:

10 Figure 1 is a schematic block diagram of a goods/services requisition supply system in accordance with an embodiment of the present invention;

Figure 2 is a schematic front view of an embodiment of a vending device for use with the system of
15 Figure 1;

Figure 3 is a schematic diagram of software architecture of software for controlling the system of Figure 1, and

Figure 4 is a schematic block diagram of an arrangement in accordance with a further embodiment of the
20 present invention.

Figure 1 illustrates a goods/services requisition and supply system which comprises a computer system generally designated by reference numeral 1 and which, in
25 this example, is a local area network (LAN) including a server 2 and PCs 2, 3, 4, 5, 6, which may be on the desktops of various operators of the computer system.

The requisition and supply system 1 also comprises a local vending device 7 which operates as a
30 peripheral of the computer system 1 and is connected to the server 2. The local vending device 7 includes storage means (not shown in Figure 1 but see later) for storing goods which may be required by operators of the computer system. Further the system 1 includes an ordering means,
35 which in this example is an ordering software module 8,

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which is resident on the server 2.

The ordering module 8 is accessible from any one of the PCs 2 to 6 and enables an operator to generate an order for a goods/services item. The ordering module 8 is
5 arranged to control the vending device 7 such that, if an item is available in the storage means of the vending device 7, the vending device is arranged so that the item will be provided to the user.

A communications link (which may be any
10 communications link, eg. telephone line, Internet) 9 is provided to supplier system 10.

The supplier operating the supplier system monitors by way of the ordering module 8 the status of the local vending device 7. The supplier can therefore
15 determine when items have been vended from the vending device 7 and act appropriately, eg. by generating an invoice for the supplied item. By way of the ordering module 8, and the communications link 9, the supplier system 10 is also able to monitor the stock status of the
20 local vending device 7 and arrange for re-stocking to ensure that items are available in the local vending device 7.

A schematic front view of the vending device 7 is shown in Figure 2. The device has a plurality of doors 11
25 to compartments (not shown) which may store goods. There is also a chute exit 12 exiting from a chute (not shown) and via which goods may be dispensed. A key pad 13 is also provided for input of information. Preferably, the key pad is a simple numeric key pad, although it may be alpha
30 numeric if required. A card reader 14 is also provided for reading details from a magnetic stripe card. As an alternative, a smart card reader may be provided. An LCD display 15 is also provided in this embodiment, although this display is not essential and a simpler display may be
35 provided or no display at all. A control means, in this

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case control unit 16 is also provided. All components are housed in a housing 17.

Each of the doors 11 to the compartments are operable under control of the control unit 16. Suitable remotely operated locks may be provided, such as disclosed in PCT/AU93/00416 referred to above. Opening of the doors 11 allows access to items within the compartments behind the doors 11, again substantially as disclosed in the co-applicant's earlier patent application PCT/AU93/00416.

Further storage means may also be provided with access to the chute 12 and an appropriate mechanism (which may be a conventional vending mechanism) for vending to the chute 12 so that the user can receive the item.

The key pad allows the user to enter a code which identifies the user to the computer system 1 and enables the vending device to give the user access to an item previously ordered via the computer system. The display 17 may provide instructions to guide the user, but is not essential.

As an alternative identification means the card reader 14 could be used to read a magnetic stripe card which identifies the user before the ordered item is released.

The card reader may also be used to read a credit card or account card for electronic funds transfer (EFT) payment for the items ordered, the EFT transaction being dealt with by the computer system under separate communications link to an EFT provider (not shown).

The local vending device 7 is arranged to operate essentially as a peripheral to the computer system 1. The ordering module 8 software on the computer system 1 is arranged to control the local vending device as if it were peripheral via control unit 16. The control unit 16 includes an interface 18 which interfaces with the ordering module 8, so that the ordering module 8 can directly

control release of doors 11 and delivery of items via chute 12. The control unit 16 may be a simple controller which is controlled directly from a server computer to or from a PC containing the ordering module 8. In other words, instructions from the remote computer control such functions of the vending device as opening the doors, dispensing a product from the chute, etc. Further, the ordering module 8 receives input from the key pad 13 or card reader 14 and may refer this input to the ordering module 8 via the interface 16. The ordering module 8 can then carry out the necessary operations and continue control of the local vending device 7 in response to the key pad 13 or card reader 14 input. If a display 15 is provided, the ordering module 8 may also control the display to guide the user through the steps necessary to obtain the item from the vending device 7, and that control may be provided by the ordering module 8 remotely controlling the control unit 16 to control the display 15.

As well as enabling the user of the computer system 1 to order items stored in the local vending device 7, the ordering module 8 also enables the user to order goods/services which are not stored in the local vending device 7 but are available for delivery from the supplier 10.

Figure 3 is a schematic diagram of the software architecture of the ordering module 8. The software includes a vending peripheral interface and control module which is arranged to control the local vending device via the interface 18 resident in the control unit 16. This module controls the release of door locks for doors 11 and operates the chute 12 for delivery of items. A product database 21 includes information on all the goods/services which are available for order both from the supplier for delivery and in the local vending device 7. The user interface 22 provides an interface to a user of a PC 2 to 6

to enable them to order goods/services. The user interface may include a suitable display providing information on goods/services available in the database and the information will include whether the goods/services are
 5 available on site at the local vending device or need to be ordered for later delivery.

The ordering engine 23 interfaces with each of the other software modules 20, 21 and 22 and controls the ordering process, including carrying out the following
 10 functions:

a) updating the product database as orders are filled, product is restocked into the local vending device, supplier makes available new items at the local vending device or for delivery and informs the ordering engine over
 15 the communications line 9, etc.;

b) provides information to the peripheral interface and control identifying which storage means an item which has just been ordered is located in so that the vending peripheral interface and control 20 may operate the
 20 appropriate door 11 or the chute 12;

c) reads the identification information which is input to the vending device 7 by user via the keypad 13 or card reader 14, and determines whether the user should be allowed to receive an item and then instructs the
 25 vending peripheral interface and control 20 in accordance with the above;

d) receives input from the user interface 22, determines whether a product which is to be ordered is on site or is available off site. If on-site it controls the
 30 vending peripheral and control 20 accordingly and if off-site generates an order which is automatically sent to the supplier by communications link 9.

As discussed above, an advantage of having the ordering module 8 software on the computer system 1 is that
 35 the power of the computer system 1 can be used to control

Figure 1 consists of 11 histograms, labeled (a) through (k), showing the distribution of the number of non-zero elements in the vector x for different values of n . The x-axis for all plots is 'Number of non-zero elements' ranging from 0 to 10. The y-axis is 'Frequency' ranging from 0 to 10. The distributions are as follows:

- (a) $n=1$: Centered around 5.
- (b) $n=2$: Centered around 4.
- (c) $n=3$: Centered around 3.
- (d) $n=4$: Centered around 2.
- (e) $n=5$: Centered around 1.
- (f) $n=6$: Centered around 0.
- (g) $n=7$: Centered around 5.
- (h) $n=8$: Centered around 4.
- (i) $n=9$: Centered around 3.
- (j) $n=10$: Centered around 2.
- (k) $n=11$: Centered around 1.

The user goes to the vending device 7 and inputs the PIN via the keypad 13. Control unit 16 detects the input to the keypad and via the interface 18 and vending peripheral interface the ordering engine determines that

the PIN input is correct and, again via the vending peripheral interface control 20, controls the vending device 7 to open one of the doors 11 of a compartment containing a printer cartridge.

5 In this embodiment an optical detection means (not shown) detects when the printer cartridge is removed from the compartment so that the ordering engine 23 knows that the product has been removed. The ordering engine 23 can then advise the supplier system that the printer
10 cartridge has been requisitioned by the user, and the supplier system can then raise an appropriate invoice.

If no optical detection (or relevant detection means) is available, the ordering engine 23 may assume that the printer cartridge has been removed when the door 11
15 operation is actuated.

Where an item is delivered via the chute 12, a suitable detection means within the chute may advise the ordering engine 23 of product delivery.

As an alternative to raising a separate bill,
20 payment may be made immediately via card reader 14 and the EFT system or credit card system (not shown).

Further, the card reader 14 may be used to identify the user, rather than using a PIN number, i.e. the approval code becomes a number or a smart card or magnetic
25 stripe card. In this case the ordering means must be aware of the number on the smart card or magnetic stripe card so that the local vending device can release the product when a number is entered which matches with that number.

The ordering engine 23 keeps the product database
30 updated as discussed previously, so that the supplier is aware when stock in the local vending device 7 is getting low and can send out a restockist.

The local vending device may also be used to receive items for recycling, such as used printer
35 cartridges, for example, in a similar manner as described

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in co-applicant's earlier PCT application. The ordering module 8 monitors items being placed in the local vending device for recycling and the operation of the system by the user would be the same as discussed above only in reverse

5 eg. user informing the ordering module 8 that it is required that an item be put into the local vending device for recycling, going to the recycling device once the ordering module 8 has been informed, the ordering module controlling one of the doors 11 to open and the user

10 putting the item to be recycled into the compartment and closing the door 11. If, during operation of the system, a PIN is provided to the user, this PIN may be in the form of an order number. As well as enabling the user access to the local vending device, this order number is transmitted

15 to the supplier system and can be used in an audit trail of the goods/services supplied.

In a further embodiment, the employee number or a identification card specifically belonging to an employee can be used to identify the user to the local vending

20 device. This enables the employer to find out who is requisitioning goods from the local vending device or from the remote supplier (i.e., for any order whether from the local vending device or remotely). This employee number or identification can also be transmitted to the supplier

25 system to use in an audit trail.

Where an EFT function or the like is provided, the key pad 13 may have dual-mode operation. In a first mode, the key pad operates in a non-secure mode for entering data for controlling operation of the vending

30 device 7 and required by the ordering means 20. In a second mode, the key pad 13 operates in a secure mode, providing encrypted data as required by the EFT system. The provision of a key pad are operating in two modes (secure and non-secure) on a vending device is a novel

35 feature.

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Note that although the above description refers to office supplies as being stored in the local vending device, any goods could be stored in the local vending device eg. foodstuffs, compact discs, etc. Similarly, any goods/services may be ordered for delivery from the supply system. Further, the above disclosure refers to an in-office computer system and associated vending device. The invention is not limited to the in-office system, but could be used with any system where supplies need to be requisitioned. For example, it could be used by a factory computer system, and others.

As discussed in the preamble, the approval code may be generated by the ordering module or may be generated externally of the system. For example, if the system is online to the supplier system, the approval code could be generated by the supplier system. Note that the approval code could map an encrypted code data on a smart card or magnetic stripe card of the user (requiring knowledge of this card identification).

The ordering module may not be resident on the computer system and, alternatively, may be resident on a supplier's computer system. Access to the ordering module is then obtained over a communications link, such as, for example, the Internet. In one embodiment, the ordering means is accessible from a supplier's website. Operation is as follows.

1. User logs onto ordering means on a supplier's website.
2. User orders goods and identifies from the website that those goods are available at a local vending device at his workplace, for example.
3. The user confirms that he would like to collect goods from the local vending device.
4. The supplier system generates an approval code or token which the user can use to identify himself to the

local vending device. Note that this approval code or token could be a magnetic stripe card owned by the user which the supplier has details of.

5. The supplier system downloads via communications means (usually Internet) the local code to the local vending device.

6. When the user approaches the local vending device and enters the approval code or token the product is released to the user.

7. Payment could be either by any of the means discussed above.

8. The local vending device may act as a local in-company store. With multiple suppliers, multiple different types of products could be stored and made available to employees or anybody with the appropriate approval code or token and having access to the local vending device.

The above vending device 7 has been described as a peripheral with all the control software being resident on the computer system 1. Although this is the preferred embodiment, it will be appreciated that the software may be resident on the local vending device 7, in which case it will need more computer power than is disclosed in the above example, or there may be some software resident in the local vending device and some software resident in the computer system 1.

An embodiment of a further aspect of the present invention is illustrated in Figure 4. In this embodiment, the vending device is not connected to the user computer system, as in the previous embodiment. In this embodiment, the vending device 30 may be accessible by a plurality of different user's computer systems 31, 32. The vending device 30 may, for example, be located in the foyer of an office building serving the computer systems of the different companies within the office building. Each computer system 31, 32 incorporates an ordering module.

If a user of the computer system wishes to order an item which is available at the vending device 30, they first of all access the ordering module and determine that the item is available at the vending device 30. In response to the placing of an order, the ordering module generates a token or approval code and provides this token or approval code via the Internet 34 to the vending device 30. The user approaches the vending device 30, enters the token or approval code via the input means and the item is provided. The ordering module on the computer system 31, 32, also advises the supply system 33 of the order, via the Internet 34.

Note that the ordering module need not be resident on the computer system but could be elsewhere, e.g. at a website provided by the supplier.

Variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

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